Awareness and Adoption of Information and Communication Technology Innovations among Secondary School Students in Anambra State, Nigeria

Obiageli Ifeoma Ikwuka[1*], Amaka Charity Okoye[2], Samuel Ade Olonikawu[2], Innocent Chiawa Igbokwe[3], Agatha Adanna Offordile[4], Chinyere Celina Okoye[1], Victoria Chidiebele Udenwa[1] and Amarachukwu Immaculeta Ezejibuaku[1]

[1]*Department of Educational Foundations, Nnamdi Azikiwe University, Awka, Nigeria.*
[2]*Department of Educational Foundations, Kogi State University, Anyigba, Nigeria.*
[3]*Department of Educational Management and Policy, Nnamdi Azikiwe University, Awka, Nigeria.*
[4]*Department of Electrical Electronics, Institute of Management and Technology, Enugu, Nigeria.*

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Despite the effort of the Federal Government of Nigeria to improve the standard of instructional delivery process in secondary schools via the introduction of Information and Communication Technology (ICT) innovations, the attainment of the ICT objectives in secondary schools still remains far-fetched. The study investigated awareness, acceptance and adoption of ICT innovations among secondary school students. Three research questions guided the study and survey research design was adopted. The population of the study consisted of all 7012 students in the 18 public secondary schools in the study area. The sample for the study comprised 360 students obtained through multi-stage sampling procedure. "Awareness of ICT Innovations among

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Corresponding author: Email: oi.ikwuka@unizik.edu.ng;

Secondary School Students" (Awareness), "Acceptance of ICT Innovations by Secondary School Students" (Acceptance) and "Adoption of ICT Innovations by Secondary School Students" (Adoption) were constructed by the researchers and used for data collection. The instruments were validated by three experts. The findings revealed that secondary school students in Aguata Local Government Area (LGA) of Anambra State are aware of ICT innovations, and have accepted them for learning. It was further revealed that the said students have adopted ICT innovations for learning to a low extent. In line with the results of the study, it was suggested that State government have to ensure that ICT innovations are made accessible to students to adopt for learning and research purposes.

1. INTRODUCTION

Information and Communication Technology (ICT) innovation refers to any new technological or digital device that disseminates different kinds of information either as write-up, statistical or graphical from one manipulator to another. It is any digital tool that can be put to use to convey information either in words or numbers. In the views of Siddike, Munshi and Sayeed [1], ICT innovation is a modern technological device that provides complex and useful help to its operators. In the context of the current study, ICT innovations are resource tools such as Online Public Access Catalogs (OPAC), Compact Disc Read Only Memory (CD-ROMs), online databases, Electronic journals (e-journals), Electronic books (e-books), internet resources, Print-On-Demand (POD), Electronic mails (e-mail) publishing, wireless publishing, electronic link and web publishing as well as internet resources that enhance effectiveness in the learning process.

ICT innovation finds use in variety of ways viz: effective lesson presentation, well-organized classroom, lesson contents development, independent examination, learner-centered activities, independent-learning, cooperative learning, and active connection between the educators of teaching-learning process and research activities [2]. Suffice it to say that ICT innovation will not be meaningful to the instructional process if secondary school students were not aware of its use for effective learning.

The necessary step towards integration of ICT innovation in secondary education is through awareness and enlightenment of staff and students This awareness campaign can be facilitated through discussions, meetings and conventions of the relevant stakeholders such as teachers and students in the secondary education system. Instructively, students'

awareness of ICT innovation may not still produce the desired results in the teaching-learning process if they are not given to the acceptance of it [2].

It is one thing for students to be aware of ICT innovation, it is another thing for them to accept it as a necessary tool for learning amidst current global reality. In recent times, the acceptance of ICT innovation has become urgent amidst the need to give strict adherence to Covid-19 protocol of social distancing. It is expected of students to conform with the need of the contemporary world and change their long-standing thoughts and approaches in line with global realities. The current global reality has reinforced the need to accept ICT innovation in secondary education. However, since it seems that there is no strict enforcement of the application of ICT innovation in secondary education in Nigeria, its acceptance among post-primary students for the teaching-learning process has become a matter of choice. It is only when students have come to the acceptance of ICT innovation that they will consider its adoption a necessity. According to Anaraki and Babalhavaeji [3], the utmost stumbling block to the adoption of ICT innovations were inadequate information about the existence of these databases and lack of training.

Despite the effort of the Federal Government of Nigeria to improve the standard of instructional delivery process in secondary schools via the introduction of ICT innovations, the attainment of the ICT objectives in secondary schools still remains far-fetched. This is evidenced by the observation of the researchers in Aguata Local Government Area (LGA) that secondary school students still engage in the traditional face to face learning amidst Covid-19 pandemic rather than using the academic online databases that have been subscribed unto by the schools. Could it be that they are not aware of ICT innovations? If they are, have they come to accept it? If

acceptance is not the issue, to what extent are ICT innovations adopted by them? This is where the problem of the study anchors which is to assess the awareness, acceptance and adoption of ICT innovations among secondary school students in Aguata LGA of Anambra State.

Oye, Aiahad and Abrahim [2] in their study assessed the awareness, adoption and acceptance of ICT innovation in higher education institution in Jos, Plateau State, Nigeria using survey research design. A sample size of 100 lecturers was obtained through simple random sampling technique. The results of the study revealed that there is awareness, acceptance and adoption of ICT innovation among lecturers. On the other hand, Ugwu and Ohimekpen [4] in their study assessed the level of awareness and use of e-learning resources by 240 secondary school teachers in Yobe State, Nigeria using survey research design. The findings of the study showed that a number of the teachers are not computer literate and are not aware of electronic-learning (e-learning) resources. Edumadze and Ossei-Anto [5] assessed the awareness and perceptions of 128 lecturers in using e-learning tools for instructional delivery in University of Cape Coast using survey design. The findings of the study depicted among other things that, many lecturers fail to use e-learning tools because they are not skilled in utilizing them. However, they are prepared or enthusiastic to partake in programmes to provide them with the necessary abilities that will make them to be capable of using the electronic learning (e-learning) tools. Ikwuka, Obumneke-Okeke, Okeke, and Adigwe [6] in their study also assessed literacy of instructional value and use of ICT by 150 teachers in secondary schools in Nnewi Education zone, Nigeria using survey design. The outcome of the study showed that secondary teachers have low level of awareness of instructional value of ICT facilities and as well do not use them extensively. In a similar study, Ivwighreghweta and Oyeniran [7] examined the level of usage and awareness of E-resources by 153 lecturers Federal University, Otuoke and the Western Delta University, Oghara using survey design. The findings of the study showed that the respondents were aware of electronic-resources (e-resources) and that the level of usage is high. Electronic-journals (e-journals) and electronic-books (e-books) were identified as the mostly referred e-resources.

It is in view of the foregoing that the following research questions were raised:

1. What ICT innovations are secondary school students in Aguata LGA of Anambra State aware of?
2. What are the ICT innovations accepted by secondary school students in Aguata LGA of Anambra State?
3. To what extent have secondary school students in Aguata LGA of Anambra State adopted ICT innovations?

2. METHODS

This study adopted survey research design. This design is deemed appropriate for the study because, according to Nworgu (2015), it seeks to study a group of items or people by gathering and evaluating data from only a few people or items considered to be representative of the entire group. The sample for the study comprised 360 (174 males and 186 females) secondary school students of average age of 16years in Aguata Local Government Area obtained through multi-stage sampling procedure. Awareness of ICT Innovations among Secondary School Students" (Awareness), Acceptance of ICT Innovations by Secondary School Students" (Acceptance) and Adoption of ICT Innovations by Secondary School Students" (Adoption) were constructed by the researchers and used for data collection. The validity of the instruments was ascertained by giving their drafts to three experts along with the purpose of the study, scope and the research questions. The reliabilities of the Awareness, Acceptance and Adoption were established using Cronbach Alpha Method by administering the Awareness, Acceptance and Adoption to a similar group of 20 students in Idemili-South LGA who did not participate in the study. Cronbach alpha is used in the study because it is applicable to polytomously scored e.g. attitude scales where there are no preferred answers or essay-type achievement tests (Nworgu, 2015). The scale of measurement used was ratio scale with 30 items on structured questionnaire. The reliability of the instruments in the three clusters were determined using Cronbach statistics. The alpha coefficients values of 0.79, 0.73 and 0.70 were respectively obtained for Awareness, Acceptance and Adoption. Statistical measures that were used to analyze the data collected were mean, frequencies and percentages. The instruments for data collection were delivered through paper and pencil. The exercise lasted for two weeks. The cut-off point for accepting percentage score for research questions one and two was 50, with the decision rule that any percentage score from

50 and above was taken as aware or accept, while percentage scores below 50 was taken as not aware or reject. The cut-off point for accepting mean score for research question three was 2.50. The decision rule was that any weighted mean score from 2.50 and above was taken as high extent, while weighted mean scores below 2.50 was taken as low extent.

3. RESULTS

3.1 Data Presentation and Discussion

In this section, data were presented, analyzed and interpreted. The foregoing was done in line with the research questions.

From Table 1, Data shows that students are most aware of e-dictionaries (75.8%). Other items of which they are aware are e-magazines (73.3%), e-newspapers (66.7%), e-books (68.6%) and compact disc-read only memory (CD-ROM) databases (69.4%). However, the students are not aware of items such as e-journals (42.8%), indexing and abstracting databases (35.8%), reference databases (Biographies, Directories, Dictionaries, Encyclopedias, and so forth (40.3%)) as well as numeric and statistical databases (32.8%). The average percentage of 55.3% reveals that the respondents are in agreement that they are aware of the ICT innovations that are used for learning. Generally, majority of secondary school students are aware of ICT innovations such as e-dictionaries, e-magazines, e-newspapers, e-books and compact disc-read only memory (CD-ROM) databases.

Table 1. Frequencies and Percentages of the ICT Innovations of which Secondary School Students in Aguata LGA are Aware

S/N	I am aware that the following ICT innovations are used in learning:	Freq.	%
1.	Electronic Journals (e-journals).	154	42.8
2.	Electronic Books (e-books).	247	68.6
3.	E-dictionaries.	273	75.8
4.	E-newspapers.	240	66. 7
5.	E-magazines.	264	73.3
6.	Compact disc-read only memory (CD-ROM) databases.	250	69.4
7.	Indexing and Abstracting Databases.	129	35.8
8.	Reference Databases (Biographies, Directories, Dictionaries, Encyclopedias, and so forth).	145	40.3
9.	Numeric and Statistical Databases.	118	32.8
10.	Online Public Access Catalogues (OPACs).	171	47.5
	Average %		55.3

Table 2. Frequencies and Percentages of ICT Innovations Accepted by Secondary School Students in Aguata LGA of Anambra State

S/N	I accept that the following ICT innovations are used in learning:	Freq.	%
11.	Electronic Journals (e-journals).	132	36.7
12.	Electronic Books (e-books).	298	82.8
13.	E-dictionaries.	301	83.6
14.	E-newspapers.	200	55.6
15.	E-magazines.	243	67.5
16.	Compact disc-read only memory (CD-ROM) databases.	285	79.2
17.	Indexing and Abstracting Databases.	107	29.7
18.	Reference Databases (Biographies, Directories, Dictionaries, Encyclopedias, and so forth).	114	31.7
19.	Numeric and Statistical Databases.	109	30.3
20.	Online Public Access Catalogues (OPACs).	126	35.0
	Average %		53.2

Table 3. Mean Scores of Respondents on Extent to which they adopt ICT Innovations in Aguata LGA of Anambra State

S/N	I adopt the following ICT innovations for learning:	Mean	Remark
11.	Electronic Journals (e-journals).	1.75	LE
12.	Electronic Books (e-books).	3.50	HE
13.	E-dictionaries.	3.76	HE
14.	E-newspapers.	3.61	HE
15.	E-magazines.	1.27	LE
16.	Compact disc-read only memory (CD-ROM) databases.	3.42	HE
17.	Indexing and Abstracting Databases.	1.60	LE
18.	Reference Databases (Biographies, Directories, Dictionaries, Encyclopedias, and so forth).	1.85	LE
19.	Numeric and Statistical Databases.	1.04	LE
20.	Online Public Access Catalogues (OPACs).	1.11	LE
	Mean of Means	**2.3**	**LE**

Data in Table 2 show that the item students mostly accepted for learning is e-dictionaries (83.6%). Other items that students accepted for learning are e-magazines (67.5%), e-newspapers (55.6%), e-books (82.8%) and compact disc-read only memory (CD-ROM) databases (79.2%). However, items such as e-journals (36.7%), indexing and abstracting databases (29.7%), reference databases (Biographies, Directories, Dictionaries, Encyclopedias, and so forth (31.7%)) as well as numeric and statistical databases (30.3%) are ICT innovations that are not accepted by students for learning. The average percentage of 53.2% shows that the respondents accepted that ICT innovations are used for learning in their schools. By implication, ICT innovations such as e-dictionaries, e-magazines, e-newspapers, e-books and compact disc-read only memory (CD-ROM) databases are accepted for learning by the majority of secondary school students.

Data in Table 3 show that the item students mostly adopted as ICT innovation for learning is e-dictionaries (3.76%). Other items that were adopted by students as ICT innovation for learning are e-newspapers (3.61%), e-books (3.50%) and compact disc-read only memory (CD-ROM) databases (3.42%). However, items such as e-magazine (1.27%), e-journals (1.75%), indexing and abstracting databases (1.60%), reference databases (Biographies, Directories, Dictionaries, Encyclopedias, and so forth (1.85%)) as well as numeric and statistical databases (1.04%) are ICT innovations that were not adopted by students for learning. The mean of means of 2.3% shows that the respondents adopt ICT innovations for learning to a low extent.

4. DISCUSSION

The indication of the results of the study is that the majority of secondary school students are aware of ICT innovations such as e-dictionaries, e-magazines, e-newspapers, e-books and compact disc-read only memory (CD-ROM) databases. The findings of the present study corroborate with the results of the Olasina [8] study on students' e-learning experiences in Nigerian universities and revealed high awareness of e-learning resources among the students. This corroboration may not be divorced from the fact that there is ubiquity of ICT innovations in this current dispensation. The findings of the present study further corroborate with the position of Fabumni [9] that there is high awareness of media technologies in teaching and learning.

Further revelation of the findings of the study is that ICT innovations such as e-dictionaries, e-magazines, e-newspapers, e-books and compact disc-read only memory (CD-ROM) databases are accepted for learning by the majority of secondary school students. The acceptance of ICT innovations among secondary school students for learning in contemporary times could be traced to the fact that students are digital natives. More so, the restrictions such as social distancing and lockdown imposed by government as a result of the novel Covid-19 pandemic has left them with no choice but to accept the innovation so as to sustain the learning process. The finding of the current study is consistent with the position of Oye, Aiahad and Abrahim [2] that ICT innovations has gained acceptance among students. The acceptance is understandable given that students have become used to mobile technologies for sundry purposes.

The depiction of the findings of the study is that ICT innovations such as e-dictionaries, e-magazines, e-newspapers, e-books and compact disc-read only memory (CD-ROM) databases are adopted for learning by the majority of secondary school students to a low extent. The rationale behind their poor adoption is predicated on the fact that the ICT innovations are not readily accessible for modern day students who are technology savvy. The findings of the current study, however, contradicts the assertions of Yunana [10] who posited that all the selected institutions used the following electronic services – E-mails, online references, electronic alerts to a high extent. This contradiction may not be unconnected to sample characteristics.

5. CONCLUSION

In line with the findings of the study, the researchers decided that secondary school students in Aguata LGA of Anambra State are aware of ICT innovations, and have accepted them for learning. It was further concluded that the said students have adopted ICT innovations for learning to a low extent.

6. RECOMMENDATIONS

Based on the findings, the following suggestions among others are made:

1. The Anambra State Government need to make ICT rules and strategies that would increase students' acceptance of ICT innovations.
2. Government should ensure that ICT innovations are made accessible to students to adopt for learning and research purposes.
3. Education Resource Center in the State have to collaborate with State Ministry of Education to inform the stakeholders in secondary education system about ICT innovations and the need to adopt them, for effective learning.
4. The Government should provide UPS devices and standby generators to take care of the epileptic power supply which may frustrate the adoption of ICT innovations.

7. LIMITATIONS

A core limitation to this study is that the three instruments were administered after the normal classroom during the lesson period. Often times, lesson periods are periods where students are taught after the traditional school closing time in most public secondary schools in Anambra State, Nigeria. It is assumed that some of the student may have been exhausted following the normal classroom period, however, the student were able to fill and return the questionnaires.

The findings of this study will serve as a baseline and literature for future researchers who wish to carryout research on awareness, acceptance and adoption of ICT innovations among students. It will provide the framework for future researchers to build their work on.

CONSENT

As per international standard or university standard, Participants' written consent has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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